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21. THE SPIDER AS BEE ENEMY

(*With a text-figure*)

Introduction

During routine inspection of apiary in spring honey flow period, occasionally spiders are spotted which seem to mean no harm. Their webs appear amidst the fencing shrubs and undergrowth. With the commencement of the monsoon season however, webs along with the spiders start appear in greater numbers in the apiary which soon form an invisible wall all around from ground to tree top levels. A close look at the web during monsoon and autumn period revealed *A. mellifera* honey bees caught in them while the others already devoured and discarded were seen on the ground below the webs. The spider webs were also a source of nuisance in the apiary during inspection work. Out of curiosity, observations were initiated on the nature and extent of damage to honey bees caused throughout the year and possibilities of some control measure.

Observations

Spider webs were located amidst and over the fencing bush foliage, amongst the apiary shrubs at 15 feet from ground level and also among the surrounding trees upto 40 feet height.

Average web size was found to be 3.5 feet across and were either round, square or pentagonal in form, though other forms also existed. Some spiders occupying these webs were caught, preserved and sent to Department of Zoology, Punjab Agricultural University, Ludhiana where they were identified as *Nephilia kuhlii.* The pattern of the webbing around the apiary was such that any forager or young bee in orientation flight was certain of getting trapped since most of them were right in the flight path of the foragers. However, it was observed that foragers which took off from the colony flew at high speed and pierced the webs to the other side without any harm while others coming laden with pollen or nectar to the hive were caught in the webs owing to their slow speed. In a separate observation taken in a private *A. indica* apiary plagued with a similar problem, comparatively less number of foragers were trapped in the webs by virtue of its being extremely agile.

Five clean webs were kept under constant scrutiny all through the day for studying the feeding behaviour of the spider. Total number of spiders in the apiary was worked out considering the number of webs scattered around. When trapped in the web, the bees tried to get free but got more perfectly entangled. This struggle by the bees was carefully watched by the spider which maintained its distance from the unfortunate victim. When the bee gave up the struggle the spider started moving towards it and carefully wrapped it up like a cocoon in a freshly spun silk web. Such cocooned bees were then suspended on one side of the web and the spider returned to its previous position, maintaining a close vigil. On an average, 10 foragers were got trapped by evening in clean webs every day. Feeding on the trapped bees continued from morning till evening. Whenever hungry, the spider approached the cocooned bees, cleaned off the silken threads and ripped open the thoracic and abdominal portion to feed on the stomach and intestinal contents. During feeding, the bees exhibited some movements but soon perished. Such devoured bees were later cast to the ground by the spider.

The apiary consisting of 50 well managed colonies of *A. mellifera* had 71 major webs within the apiary premises and 132 webs on the fencing shrubs and amongst the tree foliage. Thus, with over 200 spiders comfortably ensconced in their webs in the apiary under study, roughly 2000 foragers were lost in a day. This worked out to a loss of 40 bee foragers in one single colony. Considering the production of nearly 800 bees during this period every day in one colony the loss accruing to spider damage alone amounted to 5 per cent of the total bee production (Table 1). However, this, coupled with the damage caused by major enemies like wasp, endoparasitic mite *Tropilaelaps clareae* and birds, the colony strength soon dwindled. The loss is often colossal considering the fact that this is a scarcity period in Kangra valley of Palampur and artificial feeding has to be resorted to, so that egg laying work is not hampered in a colony. With the winter approaching, the colony situation rapidly deteriorated, calling for utmost care in organising sound management practices.

In a separate experiment with *A. mellifera* in another apiary, carbaryl 50 WP @ 0.05

TABLE 1

EXTENT OF DAMAGE (%) TO HONEY BEES*

Year	Bees	Critical destructive period in a year					
		June	July	August	September	October	November
1978**	*Apis mellifera*	<1	1.25	3.75	4.38	5	<1
	Apis indica	—	<1	1.25	2.50	3.13	2.50
1979***	*Apis mellifera*	—	<1	2.50	1.25	3.75	1.88
1980***	*Apis mellifera*	—	<1	3.13	1.50	4.38	<1

* Observations based on 5 spider nests
** Untreated
*** Treated

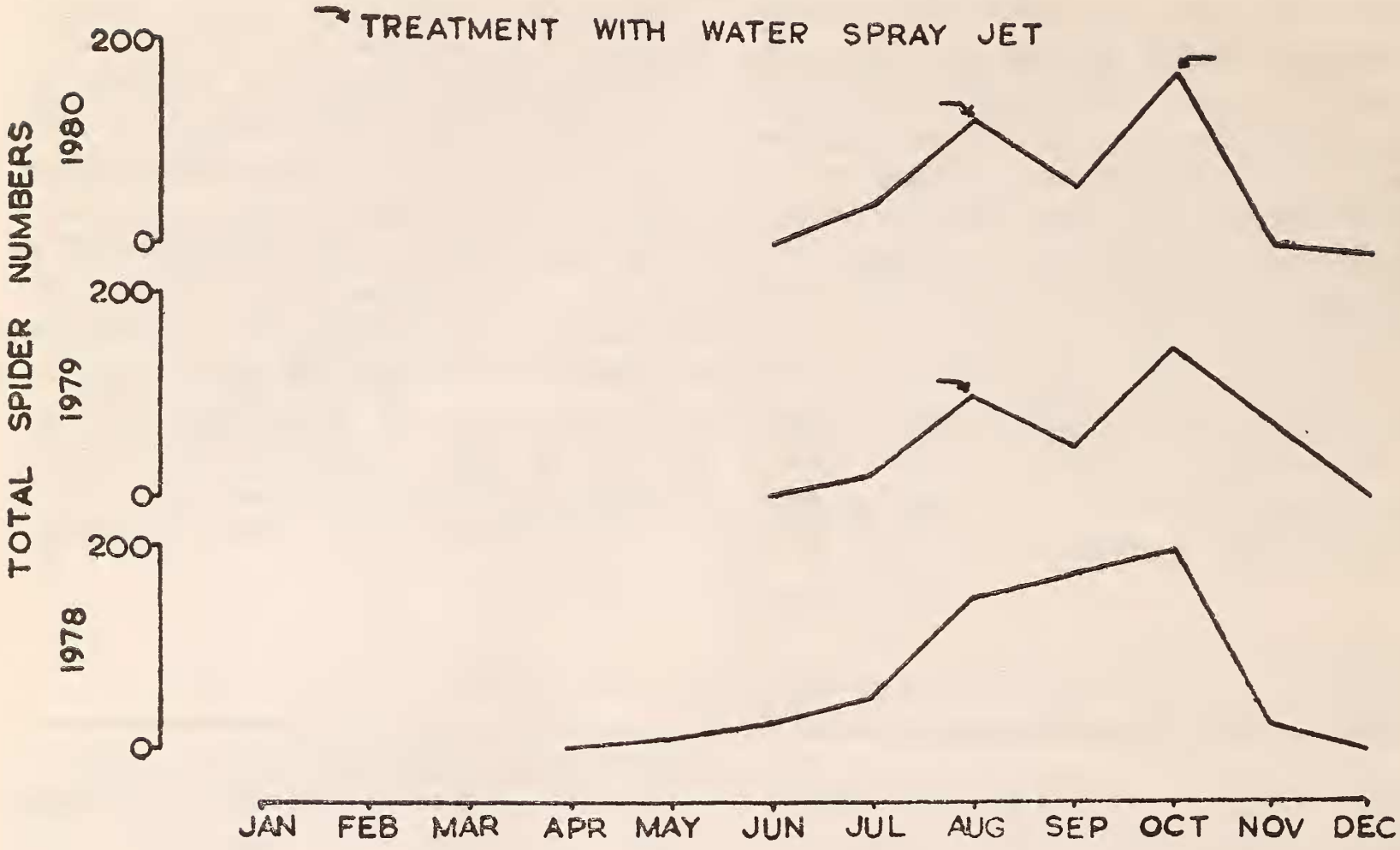

Fig. 1. Spider population throughout the year.

per cent was found to give effective check against spiders among other chemicals when sprayed at dusk after all the bees were safely inside the hives. By morning the effect of the insecticidal compound had worn off since no undesirable bee behaviour was noticed and normal colony work in all the hives progressed satisfactorily. However it was a difficult task to get rid of the spiders by resorting to chemicals for fear of careless and untimely use of the chemical by field workers. Besides, even if the spiders were killed the webs would still be a nuisance to the bees. This problem was effectively tackled by washing down the spiders along with their webs with a quick water-spray-jet. This work was done on a bright, clear and sunny day and many of the spiders receiving direct water-spray jet were paralysed and later killed. No new webs came up for good part of the season later.

Observations were again resumed the next year 1979 (Fig 1). It was found that the spider activity did not show up as early as on the previous year. It started late during July, picking-up by August and their activity was confined to certain isolated areas in the apiary. Water-spray jet treatment was given during August and consequently the population level showed a rapid decrease. However, the population level again shot up to 150 during October and the decline by November was extremely slow. This simultaneously resulted in continued loss to the bee colonies prior to winter. In the third year of 1980, spider popu-

lation showing a threatening level during August was curbed through the first water-spray jet treatment. Another treatment was resorted to during October as a result of which the problem was taken care off in good time. During this year, some of the trees, shrubs and other plants were pruned and fencing area cleaned. The distance between bush to bush was also increased so as to deny their use for webbing.

To contain the spider menace thus, it was observed that, apart from maintaining clean surroundings, use of water-spray jets once during peak time in August and another during late autumn season gave a safe, clean, economical, efficient and sure method of control.

A. K. THAKUR

Department of Entomology-Apiculture,
H. P. Agricultural University,
Palampur (HP) India-176 062.

O. P. SHARMA

Bee-Keeping Research Station,
Nagrota Bagwan, Kangra (HP) 176 047,
July 20, 1982.

22. NEW RECORDS OF APHIDS (HOMOPTERA: APHIDIDAE) FROM UTTAR PRADESH

The aphid fauna of Uttar Pradesh is comprised of 169 species belonging to 79 genera. Further exploration in the hills of Kumaon Range of the state during the period 1979-'80 17 more species were recorded for the first time from the state. With the present communication the aphid fauna of Uttar Pradesh numbers 186 species.

The material of the species reported are in the collection of Entomology Laboratory, Department of Zoology, University of Calcutta, Calcutta 700 019.

Capitophorus hippophaes mitegoni Eastop: 2 apterae viviparae ex. *Clematis buchaniana,* Nainital, 4.xii.79; many apterae viviparae and 1 alate vivipara ex. *Polygonum barbatum,* Bageshwar, 21.iii.80.

Cavariella konoi Takahashi: 15 apterae viviparae ex. *Salix babylonica,* Nainital, 16.iii.80.

Ceratovacuna silvestrii (Takahashi): 8 apterae viviparae and 9 nymphs ex. *Bambusa* sp. Almorah, 8.xii.79.

Diphorodon cannabis (Passerini): 5 apterae viviparae and 2 nymphs ex. *Cannabis sativa,* Almorah, 8.xii.79.

Greenidea longirostris Basu: 1 alate vivipara ex. indet plant of Palmaceae and ex. *Quercus* sp., Nainital, 13.iii.80.

Hyperomyzus lactuceae (Linn.): 3 apterae viviparae and 3 alatae viviparae ex. *Sonchus* sp., Nainital, 4.xii.79; 4 apterae viviparae and 4 nymphs ex. *Sonchus* sp., Ranikhet, 22.iii.80.

Liosomaphis berberidis (Kaltenbach): 6 apterae viviparae and 4 nymphs ex. *Berberis aristata,* Nainital, 13.iii.80; 4 apterae viviparae and 4 nymphs ex. *Berberis* sp., Almorah, 19.iii.80.

Macrosiphum aulacorthoides David, Narayanan and Rajasingh: 3 apterae viviparae ex. *Ocimum canum,* Nainital, 3.xii.79.

Macrosiphum euphorbiae (Thomas): 3 apterae viviparae ex. indet plant of Rosaceae, Almorah, 9.xii.79.

Metopolophium sonchifoliae Raychaudhuri, Ghosh and Das: 4 apterae viviparae and 1